WAVELET DOMAIN HALF-PIXEL MOTION COMPENSATION

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ABSTRACT

A wavelet domain half-pixel motion compensation process that reduces aliasing effects that down sampling causes in the wavelet transform uses an H-transform and provides motion estimation and compensation in wavelet domain without requiring an inverse wavelet transform. For encoding, a q-dimensional (e.g., q=2) H-transform is applied in a conventional manner to non-overlapping qxq matrices in a first frame. When determining motion vectors for a second frame, "half-pixel" interpolation of the wavelet data of the first frame determines generates half-pixel data corresponding to qxq space-domain matrices that are offset (e.g., 1 pixel) horizontally and/or vertically from the qxq matrices that were transformed. Motion estimation techniques can then identify object motion by comparing wavelet domain object data in one frame to actual and interpolated wavelet domain data for another frame. Half-pixel interpolation or data generation can be combined with multi-resolution motion estimation in a high-performance wavelet video encoder.